

090959 6552860

ATGAGAACATTAAAAACCTCATAACTGTTGTGGCCTTTAGTATTTTTTGGGTACTGTTGATTTACGTCAAT	72
GTTTATCTCTTTGGTGCTAAAGGAAGCTTGTCAATTTATGGCTTTTGGCTGATAGCTTACCTATTAGTCAAA	144
ATGTCCTTATCCTTTTTTTACAAGCCATTTAAGGGAAGGGCTGGGCAATATAAGGTTGCAGCCATTATTCCC	216
TCTTATAACGAAGATGCTGAGTCATTGCTAGAGACCTTAAAAGTGTTTCAGCAGCAAACCTATCCCCTAGCA	288
GAAATTTATGTTGTTGACGATGGAAGTGCTGATGAGACAGGTATTAAGCGCATTGAAGACTATGTGCGTGAC	360
ACTGGTGACCTATCAAGCAATGTCATTGTTTCATCGGTCAGAGAAAAATCAAGGAAAGCGTCATGCACAGGCC	432
TGGGCCTTTGAAAGATCAGACGCTGATGTCTTTTGACCGTTGACTCAGATACTTATATCTACCCTGATGCT	504
TTAGAGGAGTTGTTAAAAACCTTTAATGACCCAACTGTTTTTGGCTGCGACGGGTCACCTTAATGTCAGAAAT	576
AGACAAACCAATCTCTTAACACGCTTGACAGATATTCGCTATGATAATGCTTTTGGCGTTGAACGAGCTGCC	648
CAATCCGTTACAGGTAATATCCTTGTTTGCTCAGGTCCGCTTAGCGTTTACAGACGCGAGGTGGTTGTTCCCT	720
AACATAGATAGATACATCAACCAGACCTTCCTGGGTATTCCTGTAAGTATTGGTGATGACAGGTGCTTGACC	792
AACATGCAACTGATTTAGGAAAGACTGTTTATCAATCCACTGCTAAATGTATTACAGATGTTCCCTGACAAG	864
ATGTCTACTTACTTGAAGCAGCAAACCGCTGGAACAAGTCCTTCTTTAGAGAGTCCATTATTTCTGTTAAG	936
AAAATCATGAACAATCCTTTGTAGCCCTATGGACCATACTTGAGGTGTCTATGTTTATGATGCTTGTTTAT	1008
TCTGTGGTGGATTTCTTTGTAGGCAATGTCAGAGAATTTGATTGGCTCAGGGTTTTAGCCTTTCTGGTGATT	1080
ATCTTCATTGTTGCCCTGTGTCGGAACATTTCATTACATGCTTAAGCACCCGCTGTCCTTCTTGTTATCTCCG	1152
TTTTATGGGGTGCTGCATTTGTTTGTCTACAGCCCTTGAAATTATATTCTTTTTTACTATTAGAAATGCT	1224
GACTGGGGAACACGTAAAAAATTATTATAA	1254

SEQUENCE ID NO. 1

M R T L K N	<u>L I T V V A F S I F W V L L I Y V</u>	N	24
V Y L F G A K G S L S	<u>I Y G F L L I A Y L L V</u>	<u>K</u>	48
<u>M S L S F F Y K</u>	P F K G R A G Q Y K V A A I I P		72
S Y N E D A E S L L E T L K S V Q Q Q T Y P L A			96
E I Y V V D D G S A D E T G I K R I E D Y V R D			120
T G D L S S N V I V H R S E K N Q G K R H A Q A			144
W A F E R S D A D V F L T V D S D T Y I Y P D A			168
L E E L L K T F N D P T V F A A T G H L N V R N			192
R Q T N L L T R L T D I R Y D N A F G V E R A A			216
Q S V T G N I L V C S G P L S V Y R R E V V V P			240
N I D R Y I N Q T F L G I P V S I G D D R C L T			264
N Y A T D L G	<u>K T V Y O S T A K</u>	C I T D V P D K	288
M S T Y L K Q Q N R W N K S F F R E S I I S V K			312
K I M N N P F	<u>V A L W T I L E V S M F M M L V Y</u>		336
<u>S V V</u> D F F V G N V R E F D	<u>W L R V L A F L V I</u>		360
<u>I F I V A L C</u>	R N I H Y M L K H P L S	<u>F L L S P</u>	384
<u>F Y G V L H L F V L Q P L</u>	<u>K L Y S L F T I R</u>	N A	408
D W G T R K K L L *			417

[illegible]

primer: sel (sense, nucleotides G³¹⁶ - C³³⁷)

primer: se2 (antisense, for sense nucleotides G¹⁰³¹ - T¹⁰⁵⁰)

primer: sesp1 (sense, for nucleotides G⁴⁷⁵ - A⁴⁹⁴)

primer: sesp2 (antisense, for sense nucleotides T¹²²⁸ – A¹²⁴⁴)

Protein sequence of A98R, the PBCV-1 HA synthase

1 MGKNIIIMVS WYTIITSNLI AVGGASLILA PAITGYVLHW NIALSTIWGV SAYGIFVFGF
61 FLAQVLFSEL NRKRLRKWIS LRPKGWNDVR LAVIIAGYRE DPYMFQKCLE SVRDSYDGNV
121 ARLICVIDGD EDDDMRMAAV YKAIYNDNIK KPEFVLCESD DKEGERIDSD FSRDICVLQP
181 HRGKRECLYT GFQLAKMDPS VNAVVLIDSD TVLEKDAILE VVYPLACDPE IQAVAGECKI
241 WNTDTLLSLL VAWRYSAFC VERSAQSFRR TVQCVGGPLG AYKDIIKEIK DPWISQRFLG
301 QKCTYGDDRR LTNEILMRGK KVVFTPFVAVG WSDSPTNVFR YIVQQTRWSK SWCREIWYTL
361 FAAWKHGLSG IWLAFECLYQ ITYFFLVIYL FSRLAVEADP RAQTATVIVS TTVALIKCGY
421 FSFRAKDIRA FYFVLYTFVY FFCMIPARIT AMMTLWDIGW DTRGGNEKPS VGTRVALWAK
481 QYLIAYMWWA AVVGAGVYSI VHNWMFDWNS LSYRFALVGI CSYIVFIVIV LVVYFTGKIT
541 TWNFTKLQKE LIEDRVLYDA TTNAQSV
567

Nucleotide Sequence of A98R gene in the PBCV-1 Virus Genome

Start: ATG 50901 Stop: TGA 52607

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50881 aagacttctt gaaagttaca ATGggtaaaa atataatcat aatggtttcg tggtagacca
50941 tcataacttc aaatctaadc gcggttggag gagcctctct aatcttggct ccggaatta
51001 ctgggtatgt tctacattgg aatattgctc tctcgacaat ctggggagta tcagcttatg
51061 gtattttcgt ttttgggttt ttccttgcac aagttttatt ttcagaactg aacaggaaac
51121 gtcttcgcaa gtggatttct ctcagaccta agggttggaa tgatgttcgt ttggctgtga
51181 tcattgctgg atatcgcgag gatccttata tgtccagaa gtgcctcgag tctgtacgtg
51241 actctgatta tggcaacggt gcccgctctga tttgtgtgat tgacggtgat gaggacgatg
51301 atatgaggat ggctgccgtt tacaaggcga tctacaatga taatatcaag aagcccaggt
51361 ttgttctgtg tgagtcagac gacaaggaag gtgaacgcat cgactctgat ttctctcgcg
51421 acatttgtgt cctccagcct catcgtggaa aacgggagtg tctttatact gggtttcaac
51481 ttgcaaagat ggacccaggt gtcaatgctg tcgttctgat tgacagcgat accgttctcg
51541 agaaggatgc tattctggaa gttgtatacc cacttgcatt cgatcccag atccaagccg
51601 ttgcaggatga gtgtaagatt tggaacacag aactctttt gagtcttctc gtcgtttggt
51661 ggtactattc tgcgttttgt gtggagagga gtgccagtc ttttttcagg actgttcagt
51721 gcgttggggg gccactgggt gcctacaaga ttgatatacat taaggagatt aaggaccctt
51781 ggatttccca gcgctttctt ggtcagaagt gtacttacgg tgacgaccgc cggctaacca
51841 acgagatctt gatgcgtggt aaaaagggtg tgttcaactc atttgctggt ggttggtctg
51901 acagtccgac caatgtgttt cggtagatcg ttcagcagac ccgctggagt aagtcgtggt
51961 gccgcgaaat ttggtacacc ctcttcgccg cgtggaagca cggtttgtct ggaatttggc
52021 tggcctttga atgtttgtat caaattacat acttcttctt cgtgatttac ctcttttctc
52081 gcctagccgt tgaggccgac cctcgcgccc agacagccac ggtgattgtg agcaccacgg
52141 ttgcattgat taagtgtggg tatttttcat tccgagccaa ggatattcgg gcgttttact
52201 ttgtgcttta tacatttgtt tactttttct gtatgattcc ggccaggatt actgcaatga
52261 tgacgctttg ggacattggc tgggatactc gcggtggaaa cgagaagcct tccgttggca
52321 cccgggtcgc tctgtgggca aagcaatatc tcattgcata tatgtggttg gccgcggttg
52381 ttggcgctgg agtttacagc atcgtccata actggatggt cgattggaat tctctttctt
52441 atcgttttgc tttggttggg atttgttctt acattgtttt tattgttatt gtgctggtgg
52501 tttattttcac cggcaaaatt acgacttgga atttcacgaa gcttcagaag gagctaactg
52561 aggatcgcgt tctgtacgat gcaactacca atgctcagtc tgtgTGAttt ttcctgcaag

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Nucleotide and Protein Sequence of *Pasteurella multocida*

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1      M N T L S Q A I K A Y N S N D Y Q
-18   ATTTTTTAAGGACAGAAAATGAATACATTATCACAAGCAATAAAAGCATATAACAGCAATGACTATCAA

18    L A L K L F E K S A E I Y G R K I V E F Q I T
52    TTAGCACTCAAATTATTTGAAAAGTCGGCGGAAATCTATGGACGGAAAATTGTTGAATTTCAAATTACC

41    K C Q E K L S A H P S V N S A H L S V N K E E
121   AAATGCCAAGAAAACTCTCAGCACATCCTTCTGTTAATTCAGCACATCTTTCTGTAAATAAAGAAGAA

64    K V N V C D S P L D I A T Q L L L S N V K K L
190   AAAGTCAATGTTTGCATAGTCCGTTAGATATTGCAACACAACCTGTTACTTTCCAACGTAAAAAATTA

87    V L S D S E K N T L K N K W K L L T E K K S E
259   GTACTTTCTGACTCGGAAAAAACACGTTAAAAATAAATGGAAATTGCTCACTGAGAAGAAATCTGAA

110   N A E V R A V A L V P K D F P K D L V L A P L
328   AATGCGGAGGTAAGAGCGGTCGCCCTTGTACCAAAGATTTTCCCAAAGATCTGGTTTTAGCGCCTTTA

133   P D H V N D F T W Y K K R K K R L G I K P E H
397   CCTGATCATGTTAATGATTTTACATGGTACAAAAAGCGAAAGAAAAGACTTGGCATAAACCTGAACAT

156   Q H V G L S I I V T T F N R P A I L S I T L A
466   CAACATGTTGGTCTTTCTATTATCGTTACAACATTCAATCGACCAGCAATTTTATCGATTACATTAGCC

179   C L V N Q K T H Y P F E V I V T D D G S Q E D
535   TGTTTAGTAAACCAAAAAACACATTACCCGTTTGAAGTTATCGTGACAGATGATGGTAGTCAGGAAGAT

202   L S P I I R Q Y E N K L D I R Y V R Q K D N G
604   CTATCACCGATCATTGCGCAATATGAAAATAAATTGGATATTCGCTACGTCAGACAAAAAGATAACGGT

225   F Q A S A A R N M G L R L A K Y D F I G L L D
673   TTTCAAGCCAGTGCCGCTCGGAATATGGGATTACGCTTAGCAAAATATGACTTTATTGGCTTACTCGAC

248   C D M A P N P L W V H S Y V A E L L E D D D L
742   TGTGATATGGCGCCAAATCCATTATGGGTTTATTCTTATGTTGCAGAGCTATTAGAAGATGATGATTTA

271   T I I G P R K Y I D T Q H I D P K D F L N N A
811   ACAATCATTGGTCCAAGAAAATACATCGATACACAACATATTGACCCAAAAGACTTCTTAAATAACGCG

294   S L L E S L P E V K T N N S V A A K G E G T V
880   AGTTTGCTTGAATCATTACCAGAAGTGAAAACCAATAATAGTGTGCGCAAAAGGGGAAGGAACAGTT

317   S L D W R L E Q F E K T E N L R L S D S P F R
949   TCTCTGGATTGGCGCTTAGAACAATTGAAAAACAGAAAATCTCCGCTTATCCGATTCGCCTTTCCGT

340   F F A A G N V A F A K K W L N K S G F F D E E
1018  TTTTTTGCGGCGGTAATGTTGCTTTTCGCTAAAAATGGCTAAATAAATCCGGTTTCTTTGATGAGGAA

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363 F N H W G G E D V E F G Y R L F R Y G S F F K
1087 TTTAATCACTGGGGTGGAGAAGATGTGGAATTTGGATATCGCTTATTCCGTTACGGTAGTTTCTTTAAA

386 T I D G I M A Y H Q E P P G K E N E T D R E A
1156 ACTATTGATGGCATTATGGCCTACCATCAAGAGCCACCAGGTAAAGAAAATGAAACCGATCGTGAAGCG

409 G K N I T L D I M R E K V P Y I Y R K L L P I
1225 GGAAAAAATATTACGCTCGATATTATGAGAGAAAAGGTCCCTTATATCTATAGAAAACCTTTTACCAATA

432 E D S H I N R V P L V S I Y I P A Y N C A N Y
1294 GAAGATTTCGCATATCAATAGAGTACCTTTAGTTTCAATTTATATCCAGCTTATAACTGTGCAAACATAT

455 I Q R C V D S A L N Q T V V D L E V C I C N D
1363 ATTCAACGTTGCGTAGATAGTGCAGTGAATCAGACTGTTGTTGATCTCGAGGTTTGTATTTGTAACGAT

478 G S T D N T L E V I N K L Y G N N P R V R I M
1432 GGTTC AACAGATAATACCTTAGAAGTGATCAATAAGCTTTATGGTAATAATCCTAGGGTACGCATCATG

501 S K P N G G I A S A S N A A V S F A K G Y Y I
1501 TCTAAACCAAATGGCGGAATAGCCTCAGCATCAAATGCAGCCGTTCTTTTGCTAAAGGTTATTACATT

524 G Q L D S D D Y L E P D A V E L C L K E F L K
1570 GGGCAGTTAGATT CAGATGATTATCTTGAGCCTGATGCAGTTGAACTGTGTTTAAAAGAATTTTTAAAA

547 D K T L A C V Y T T N R N V N P D G S L I A N
1639 GATAAACGCTAGCTTGTGTTTATACCACTAATAGAAACGTCAATCCGATGGTAGCTTAATCGCTAAT

570 G Y N W P E F S R E K L T T A M I A H H F R M
1708 GGTTACAATTGGCCAGAATTTTCACGAGAAAAACTCACAACGGCTATGATTGCTCACCCTTTAGAATG

593 F T I R A W H L T D G F N E K I E N A V D Y D
1777 TTCACGATTAGAGCTTGGCATTAACTGATGGATTCAATGAAAAAATGAAAATGCCGTAGACTATGAC

616 M F L K L S E V G K F K H L N K I C Y N R V L
1846 ATGTTCCCTCAAACCTCAGTGAAGTTGGAAAATTTAAACATCTTAATAAAATCTGCTATAACCGTGTATTA

639 H G D N T S I K K L G I Q K K N H F V V V N Q
1915 CATGGTGATAACACATCAATTAAGAAACTTGGCATTCAAAGAAAAACCATTTTGTGTAGTCAATCAG

662 S L N R Q G I T Y Y N Y D E F D D L D E S R K
1984 TCATTAAATAGACAAGGCATAACTTATTATAATTATGACGAATTTGATGATTTAGATGAAAGTAGAAAG

685 Y I F N K T A E Y Q E E I D I L K D I K I I Q
2053 TATATTTTCAATAAAACCGCTGAATATCAAGAAGAGATTGATATCTTAAAGATATTAAATCATCCAG

708 N K D A K I A V S I F Y P N T L N G L V K K L
2122 AATAAAGATGCCAAATCGCAGTCAGTATTTTTATCCCAATACATTAAACGGCTTAGTGAAAAAACTA

731 N N I I E Y N K N I F V I V L H V D K N H L T
2191 AACAATATTATTGAATATAATAAAATATATTTCGTTATTGTTCTACATGTTGATAAGAATCATCTTACA

754 P D I K K E I L A F Y H K H Q V N I L L N N D
2260 CCAGATATCAAAAAAGAAATACTAGCCTTCTATCATAACATCAAGTGAATATTTTACTAAATAATGAT

777 I S Y Y T S N R L I K T E A H L S N I N K L S
 2329 ATCTCATATTACACGAGTAATAGATTAATAAAACTGAGGCGCATTTAAGTAATATTAATAAATTAAGT

 800 Q L N L N C E Y I I F D N H D S L F V K N D S
 2398 CAGTTAAATCTAAATTGTGAATACATCATTTTTTGATAATCATGACAGCCTATTTCGTTAAAAATGACAGC

 823 Y A Y M K K Y D V G M N F S A L T H D W I E K
 2467 TATGCTTATATGAAAAATATGATGTCGGCATGAATTTCTCAGCATTAAACACATGATTGGATCGAGAAA

 846 I N A H P P F K K L I K T Y F N D N D L K S M
 2536 ATCAATGCGCATCCACCATTTAAAAAGCTCATTAAACTTATTTTAATGACAATGACTTAAAAAGTATG

 869 N V K G A S Q G M F M T Y A L A H E L L T I I
 2605 AATGTGAAAGGGGCATCACAAGGTATGTTTATGACGTATGCGCTAGCGCATGAGCTTCTGACGATTATT

 892 K E V I T S C Q S I D S V P E Y N T E D I W F
 2674 AAAGAAGTCATCACATCTTGCCAGTCAATTGATAGTGTGCCAGAATATAACACTGAGGATATTTGGTTC

 915 Q F A L L I L E K K T G H V F N K T S T L T Y
 2743 CAATTTGCACTTTTAATCTTAGAAAAGAAAACCGGCCATGTATTTAATAAAACATCGACCCTGACTTAT

 938 M P W E R K L Q W T N E Q I E S A K R G E N I
 2812 ATGCCTTGGGAACGAAAATTACAATGGACAAATGAACAAATTGAAAGTGCAAAAAGAGGAGAAAATATA

 961 P V N K F I I N S I T L *
 2881 CCTGTTAACAAGTTCATTATTAATAGTATAACTCTATAA